What is claimed is:

1. A process for injection molding a hollow plastic article comprising the steps of:

(a) injecting a quantity of plastic material into a mold cavity to substantially fill the mold cavity;

(b) applying a packing pressure to the plastic in the mold cavity;

(c) injecting pressurized gas into the plastic material in the mold cavity in order to combine the application of packing pressure to the plastic;

(d) holding the pressure of the gas and plastic in the mold cavity for a predetermined amount of time; and

(e) allowing a portion of the plastic material in the mold to be expelled into at least one secondary cavity coupled to the mold cavity by opening a valve in a runner connecting the mold cavity to the secondary cavity.

2. The process as set forth in claim 1 further comprising the steps of:

(f) permitting the plastic material to solidify;

(g) exhausting the gas from the mold cavity; and

(h) removing the plastic article from the mold.

3. The process as set forth in claim 1 wherein said plastic article has at least one section which is thicker than other sections and said charge of pressurized gas is introduced into the thicker section in order to form a hollow portion therein.

4. The process as set forth in claim 1 further comprising the step of applying the packing pressure to the plastic material injection pressure in the mold cavity for a predetermined period of time prior to the injection of gas into the plastic material.

5. The process as set forth in claim 1 wherein said plastic material is injected into the mold cavity from an injection molding machine with a barrel and nozzle, said method further comprising the step of allowing a portion of the plastic material in the mold to be expelled back into the barrel of the injection molding machine.

6. The process as set forth in claim 1 wherein portions of the plastic material are expelled into at least two secondary cavities.

7. The process as set forth in claim 1 further calculating the volume of said at least one secondary cavity in order to allow expulsion of a predetermined amount of plastic material from the mold cavity.

8. The process as set forth in claim 1 wherein at least two secondary cavities are provided and the step of allowing a portion of the plastic material in the mold to be displaced into the secondary cavities comprises opening valve members positioned in conduits connecting the mold cavity with the secondary cavities.

9. The process as set forth in claim 8 further comprising the step of sequentially controlling the opening of the valve members in order to allow selective displacement of plastic material into the at least two secondary cavities.

10. A process for injection molding a hollow plastic article comprising the steps of:

(a) injecting a quantity of plastic material into a mold cavity to substantially fill the mold cavity;

(b) applying a packing pressure to the plastic in the mold cavity;

(c) injecting pressurized gas into the plastic material in the mold cavity;

(d) holding the pressure of the gas and plastic in the mold cavity for a predetermined amount of time;

(e) allowing a portion of the plastic material in the mold to be expelled into at least one secondary cavity coupled to the mold cavity;

(f) permitting the plastic material to solidify;

(g) exhausting the gas from the mold cavity; and

(h) removing the plastic article from the mold.

11. The process as set forth in claim 10 wherein said plastic article has at least one section which is thicker than other sections and said charge of pressurized gas is introduced into the thicker section in order to form a hollow portion therein.

12. The process as set forth in claim 10 further comprising the step of applying the packing pressure to the plastic material injection pressure in the mold cavity for a predetermined period of time prior to the injection of gas into the plastic material.

13. The process as set forth in claim 10 wherein said plastic material is injected into the mold cavity from an injection molding machine with a barrel and nozzle, said method further comprising the step of allowing a portion of the plastic material in the mold to be expelled back into the barrel of the injection molding machine.

14. The process as set forth in claim 10 wherein portions of the plastic material are expelled into at least two overflow cavities.

15. The process as set forth in claim 10 further calculating the volume of said at least one secondary cavity in order to allow expulsion of a predetermined amount of plastic material from the mold cavity.

16. The process as set forth in claim 10 wherein the step of allowing a portion of the plastic material in the mold to be displaced comprises

opening a valve member in a conduit connecting the mold cavity with the secondary cavity.

17. A process for injection molding a hollow plastic article utilizing an injection molding machine with a barrel and nozzle and a mold with a mold cavity therein having a shape defining at least a portion of the article, said method comprising the steps of:

(a) injecting a quantity of plastic material into the mold cavity from the injection molding machine;

(b) injecting pressurized gas into the plastic material in the mold cavity; and

(c) allowing a first portion of the plastic material in the mold to be expelled back into the barrel of the injection molding machine.

18. The process as set forth in claim 17 further comprising the step of holding the constant pressure of the gas and plastic material in the mold cavity for a predetermined amount of time before said first portion of the plastic material is expelled back into the injection molding machine.

19. The process as set forth in claim 17 wherein a predetermined amount of plastic material is expelled back into the injection molding machine.

20. The process as set forth in claim 17 wherein the gas is injected into the plastic material of a location at a distance from the nozzle of the injection molding machine.

21. The process as set forth in claim 17 wherein said plastic article has at least one section which is thicker than other sections and said pressurized gas is introduced into the thicker section in order to form a hollow portion therein.

22. The process as set forth in claim 17 further comprising the step of also allowing a second portion of the plastic material in the mold to be expelled into at least one secondary cavity coupled to the mold cavity.

23. The process as set forth in claim 22 further comprising the step of also allowing a third portion of the plastic material in the mold to be expelled into a second secondary cavity coupled to the mold cavity.

24. The process as set forth in claim 22 wherein the step of allowing a second portion of the plastic material in the mold to be expelled into at least one secondary cavity comprises opening a valve member in a conduit connecting the mold cavity with the secondary cavity.

25. The process as set forth in claim 17 wherein the step of allowing a first portion of the plastic material in the mold to be expelled back into the barrel of the injection molding machine comprises opening a shut-off valve member positioned between said mold cavity and said barrel.

26. The process as set forth in claim 25 wherein said valve member is included as part of the nozzle.